ALTIMETER	MANOMETER
2000	2000
4050	4000
4550	4610
5125	5150
5750	5850
5990	6000
6890	6800
6920	6900
7980	8000

SHOUT
SHARE
IT

F. Pension. (April 12)

Central arrows.

(corrected) Small: appx .5

ALTIMETER MANOMETER Broad: exactly 6

6900 - 6920 Long: appx. 9.35

Insert. Between 29.8 and 29.9

Arrow inner ring: a little above 0

Arrow outer ring: .6

E. Upper Pasteur (April 13)

Central arrows:

Small: appx .6

6800 - 6889 Broad: 6.8

Long: appx. 6.178

Insert. 29.838

Arrow inner ring: .1

Arrow outer ring: 1.8

III Great Bend

Altimeter	(Corrected) Manometer	Central arrows
~~Manometer~~	~~Inch~~	Small : 0.5
		Broad : 5.75
5750' —	5850	Long : 7.22

IV Upper edge Clamos

	Central arrows
	Small : 0.4
	Broad : 5.1
5125' — 5150	Long : 1.25

V. El Nato

	Central arrows
	Small : 0.4
	Broad : 4.5
4550 — 4610	Long : 4.85

(The other indicators were the same at all 3 of these last stations
Arrow inner wing : 0.08. Arrow outer wing : 0.8. Dial : 29.8375.)

Fremont
12,000 +

Mixed Flocks

October 4, 1960
Ceno-Punta

Beginning work just below bugs pasture 6:50 a.m.

Group I. 2 Yellow-thighs 2 Sooty caps 1 Black-checked W. 1 Wilson's 1 W. ↗ 1 Hummingbird.

1 Yellow-thighs ↓. 1 Sooty caps ↓. 1 Wilson's leaving without C. ↓.

---

2 ↗ Wilson's W. feeding about 20 feet apart. Apparently both quite isolated. When one flies over to attack the other! This is why there is only one Wilson's per flock.

Group II 1 Flame throat. 1 Mixed Glycaliben. 2 Collared Redstarts

---

Group III. 3 Yellow-thighs. 1 Wilson's W. 2 Black-checked W. 1 Collared R.

Wilson's W. always seems to be on the outskirts of mixed flocks. Extremely peripheral!

In Group III, the Black-checked W's definitely did not continue to go in the direction in which the Yellow-thighs went.

Mixed Parties

Group IV 1 ♂ Wilson's W. 1 Eye-ringed Flatbill

1 Wilson's ♂ → Flatbill.

Group I Same place - 2:20 p.m.
3 Yellow-thighs 1 Yellow-throat

1 Yellowthroat ♂ → Yellow-thighs

Group VI Above upper pasture.
2 Collared R, 1 ♂ Wilson's W., 1 Yellowcrown Flycatcher

It is obvious that the Collared Redstarts, the Wilson's Warblers, and some of the small flycatchers (and possibly the Flame-throated Warblers) are not nearly as closely confined to brush as the brush-tanagers and brush-finches. They will feed in and among isolated trees in the bare pasture, where the brush birds apparently never go.

Twice today (once above and once below the upper pasture) I have seen one or two Red Squirrels running around in the shrubbery near where mixed flocks of birds were feeding. Silent both times. But last March I remember watching a group of 3 squirrels, feeding in much the same area as a mixed flock of birds; and these squirrels were quite noisy — uttering harsh notes like CN's or dCN's of some brush finches (Ptilene).

Perhaps the squirrel is really a member of these mixed flocks too

I have now seen a pair of Slate-throated Redstarts (upkeep, above the upper pasture!) feeding on the ground. On a bare 6 ft-wide trail.

I have been much impressed by how quiet all the mixed flocks have been to be now.

Group VII 3 Yellow-throats, 1 ♂ Wilson's W.

Wilson's ♂ ——→ Yellow-throats

Group VIII 2 ♂♂ and 1 ♀ Wilson's W. (!!!), 1 Collared R, 1 Slate-throated R, 1 Black-cheeked W.

1 Collared R ♂ ——→ Slate-throat R

Again saw Slate-throated R, feeding on ground, while Collared R fed just above ground.

Redstarts seem to be only noisy in flight now — when they utter loud "Tut" CN's.

Group IX 3 Yellow-thighs, 2 Yellow-throats

1 Yellow-thigh ♂ ——→ Yellow-throat
1 Yellow-throat ♂ ——→ Yellow-thigh

Group X 2 Sooty caps, 1 Black-cheek W, 2 Yellow-thighs, 1 ♂ Wilson's W., 1 Slate-throat R, 1 Collared R, 1 mid. Wren

1 Sooty cap ♂ ——————→
1 Sooty cap ♀ ←——————

1 Black-cheek j. ——→ Yellow-thigh
1 Yellow-thigh f. ——→ Black-cheek

I have used the term "following" in this count in a rather different way from in our counts of the blue and green tanagers and honeycreepers. I have included following by hopping as well as by flying. And I have counted each following hop separately, as long as the successive hops were separated by an appreciable pause. The Yellow-thigh following the Black-cheek recorded above may be cited as an example. All 6 instances of following were really part of one reaction. The Black-cheek was moving rapidly through the bushes. The Yellow-thigh hopped after it, paused, hopped again, paused, etc etc etc etc.

October 4, 1960
Cerro Punta

In great bendarca, 6:15 a.m.

Group I. 6 Brown-caps, 2 Buff-fronted Foliage-gleaners, 1 Silver-throat, 2 Yellow-thighs, 2 Chestnut-capped Attapetes (!), 1 Slate-throated R

3 Foliage-gleaners j ——→ Brown-caps
1 Silver-throat j ——→
5 Foliage-gleaners f. ——→ Brown-cap

(The association of the Chestnut-capped Attapetes with this flock was probably purely coincidental. Just passing through.)

3 Yellow-thighs f. ——→

This flock seemed to form about 1/2 hour after dawn. When it was active and noisy (i.e the Brown-caps were noisy) for about 1/2 to

3/4 of an hour. Hour (7:55 a.m.) the birds are carefully silent and comp
aratively sluggish. I have great difficulty seeing the birds now, but I
don't think the flock has actually broken up yet.

1 Yellow-thigh ♂ ——→ Brown-cap ♀
1 Brown-cap ♂ ——→ Yellow-thigh ♀
1 Brown-cap ♂ ——→ Yellow-thigh ♀

Also 1 ♂ Yellow-faced Grosbeak and a couple of hummingbirds in flock temporarily.

There was another burst of activity in the group around 8:15 a.m., but this quickly died down.

Group II 1 Blue Grosbeak, 1 ♂ Wilson's W.
1 Wilson's W. ♀ ——→ Blue

Group III 2 Slate-throat R., 1 ♂ Wilson's W.
1 Wilson's W ♀ ——→ Slate-throats

It was quite noticeable that the 1 Blue Grosbeak mentioned above made no attempt to join the Brown-caps, although the latter were quite visible and audible about 100 yards away.

Group I (again) 1 Yellow-thigh ♀ ——→ Brown Caps

I think the counts of Group I today do not give a really fair picture of the closeness of the association between the Yellow-thighs and the Brown-caps in this flock. The Yellow-thighs stuck with the Brown-caps almost all the time. The counts of joining and following are so low simply because the Yellow-thighs are so difficult to see most of the time.

1 Pepper-throwe and 1 ♀ Wilson's W also joined the flock
also 1 Lesser-Collared Robin.

For the first time this morning I saw a pair of Black-cheeked Warblers down here. They were not with a mixed flock, however. (Although by the time I saw these warblers, ca. 9:55, the flocks had rather disappeared anyhow.)

One apect of Group I this morning was rather surprising. The birds moved up and down, quite regularly, along appx 750 yds of road. They worked on both sides of the road, sometimes penetrating 50 yds or so into the brush, away from the road, but no more. They seemed to be following a regular route, going clockwise around an irregular oval. Again and again. They never strayed out of this area, although there did not seem to be any mixed flocks (or any other Brown-caps by themselves) on any side!

There were a few brief bursts of activity in the Group I mixed flocks until about 9:15 a.m. Separated by longer and longer intervals. And then the birds just disappeared. Presumably resting.

I am fairly certain that the 2 birds I have cited as "Buff-fronted Foliage-gleaners" above were indeed Philidor rufus. It is just barely possible, however, that they were Anabacerthia variegaticeps or Craniolaema erythrops. I must check with these.

In any case, this pair of "Foliage gleaners" was obviously very very closely attached to the Brown-caps (probably even more so than the Yellow-thighs). Stuck with the Brown-caps almost steadily. Followed them everywhere.

As a result of two days' observation here this trip, I am beginning to think that the mixed flocks here, like the mixed flocks on BCI, tend to be composed of 2 partly different associations. Here they are the warblers and

ovation (comparable to the honeycreeper association on BCI) and the bush finch and bush-tanager association (comparable to the tanager association on BCI).

One thing I forgot to mention above .... The Brown-caps were very noisy, this morning, when 5 or 6 of them were quite close together, and there was a lot of excited-looking flying back and forth. This flying back and forth was usually accompanied by lots of R. (I think these R's were only uttered in flight. In any case, they were the sort of R which always makes me think of "CN-Jill"s. Between flights & R's, the birds uttered only single CN's, or fairly slow series of 2 or 3 or 4 CN's. Mostly "Jack" CN's, I think.) I think these R's and flights must have been hostile. If so, there is still hostility within the flock, even in the middle of the non-breeding season. Interestingly enough, birds of other species seemed to be particularly likely to join and follow Brown-caps when they were flying about excitedly and uttering lots of R's. The intra-specific hostility of Brown-caps may be considered "attractive" to other species

I think the mixed flocks here must be more highly developed than the blue and green tanager and honeycreeper flocks in the low-lands. There are relatively more cases of overt following and joining here. And I have yet to see an inter-specific supplanting attack here!

The relationship between the Brown-caps and the Yellow-thighs is certainly not dependent on food. The Yellow-thighs often follow 20 feet behind, and 30-50 feet below the Brown-caps

The Foliage-gleaners, however, are usually right up there with the Brown-caps. So they may well get insects disturbed by the Brown-caps

2:55 p.m. Working just above the Clarks

Group IV 6 Golden-crowned Warblers, 1 Plate-throat R, 1 Woodcreeper

1 Plate throat R ♂ ⟶ Golden-crown W
1 Plate throat R ♂ ⟶ Golden-crown W
1 Woodcreeper ♂ ⟶ Plate-throat R

Group V 5 Silver-throats, 2 Parula W, 1 Woodcreeper, 1 Pepper-shrike
1 Golden-wing W, 1 Green Honeycreeper, 1 hummingbird

1 Silver-throat ♂ ⟶ Parula
1 Honeycreeper ♂ ⟶ Silverthroat
1 Parula intra-specific fights
2 Silver-throat intra-specific fights
1 Golden-wing W. ♂ ⟶ Pepper-shrike

Group VI 2 Wilson's W, 2 Blue Tanagers, 1 Silver-throat, 1 Pepper-shrike, 1 Plate-throated R, 1 Boy headed Tanager, 1 Black and white W, 1 White-winged Tanager, 1 Greater Kiskadee, 2 Woodcreepers.

1 Blue ♂ ⟶ Boy-headed

(suppliants) * Also a couple of Pale-bellied Robins in group

1 Blue ♂ ⟶
1 Kiskadee supplanting Robin

It is obvious that down here we are getting very heterogeneous "open woods" mixed flocks, like the ones in young second-growth at the Canal Zone. It may be significant, therefore, that I saw my first inter-specific mobbing attacks, and my first intra-specific combat fights, here in the flocks this afternoon

Although there are certainly Yellow-throated Vireos around be

re now, I have yet to see one of them in a mixed flock this afternoon (but I did see a pair following a mixed flock here on the afternoon of Oct 3, the day I arrived). I think they probably join mixed flocks less frequently here, because Yellow-thighs are absent from the area (and Brown-caps are relatively rare).

The Golden-crowned Warblers are very noisy when moving about. Utter a "Tsit" call, accelerating into a "Trill" in flight. These notes are even louder and stronger than those of the Black-cheeked Warblers.

I think (but am not sure) that all the Woodcreepers I have seen this afternoon have been Spot-crowned Woodcreepers, Lepidocolaptes affinis

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Group VII (Again) There was quite a heavy rain after my last observations recorded above, but it finally stopped at 3:30 p.m.

I then went back to Group VII and found it still very lively generally.

By this time, at least 3 Brown-caps had joined the flock. They did not seem to be very "nuclear" in this flock. Other species were not reacting to them very frequently (I saw no definite cases of following or joining). I imagine that the Brown-caps were less "attractive" simply because there was too much "competition" around — especially the very noisy Olive-throats and Golden-crowned Warblers. You could hardly hear the Brown-caps in the general din, and many of the other species in the flock were at least as restless as the Brown-caps.

October 6, 1960
Cerro Punta

6:15 a.m. Working uphill at the head of Cerro Punta

"Mixed Flocks"

Group I 3 Brown-caps, 1 Slate-throat, 2 Olive Honeycreepers

1 Honeycreeper ——→ Brown-caps

Group II 2 Brown-caps, 3 Pale-vented Robins, 1 rufous flycatcher, 1 Yellow-throat, 2 Silver-throats, 1 Solitaire, 1 Plain-colored T.

2 Robins ——→ Brown-caps.

1 Robin ——→ Brown-cap

2 Robins supplanting Silver-throat

Group III 3 Brown-caps, 2 Yellow-throats, 1 Pale-vented Robin, 1 Wren, 1 Woodcreeper, 1 Ruddy-capped Nightingale-Thrush

1 Brown-cap ——→ Yellow-throats

The Brown-cap seemed to be attracted by a burst of SR among the Yellow-throats. When the Yellow-throats began SR, all the Brown-caps began SR, and one flew over to the tree in which the Yellow-throats were perched.

1 Wren ——→ Yellow-throats

1 Yellow-throat ←——

A burst of SR-ing by the Brown-caps seems to provoke a burst of quite loud "Tuck" CN's by the Yellow-throats (who had been silent before) Then a general burst of calling by all the birds in the groups, including the Woodcreeper

Group IV 2 Slate-throats, 1 Wilson's W.

Group V 2 Brown-caps, 1 Silver-throat, 1 Collared R, 1 Flame-throated R, 1 Golden-winged W., 1 Green Honeycreeper, 1 Wilson's W, 2 Black and white

to W, 1 Woodpecker (?)

Group I 2 Yellow-throats, 1 ♂ and 1 ♀ Wilson's W., 1 Black-checked W.

1 Black-cheek ♂ → Yellow-throats
1 Supplanting attacks ♂ Wilson's → ♀

Group VII 2 Yellow-throats, 1 ♂ Wilson's W., 1 Note-throat R

1 Distress-squeak flight between Yellow-throats

Group VIII 2 Yellow-thighs, 6 Brown-caps, 2 Collared R., 2 Red-faced Squirrels, 1 ♂ Diploma, 1 ♂ Wilson's W., 1 ♀ Black-throat

1 Yellow-thigh ♂ → Brown-caps
1 Collared R. ♂ →
2 Pepper-checks ♂ → Brown-caps
1 Yellow-thigh ♂ → Brown Caps
1 Red-faced Squirrel ♂ →

I think, from my observations this morning, that the Yellow-throats are not really nuclear members of these flocks. More or less regular associates, more or less like the Jays in the blue and open woods and hemlock flocks

Back in the same area 3:20 p.m.

Group IX (probably the same as VIII above) 2 Note-throats, 1 Black-throat, 2 Brown-caps, 1 Yellow-thigh,

Group I (Probably present all same as II above) 3 Silver-throats, 2 Brown-caps, 2 Slate-throats, 1 Blue T, 1 Green Junco, 1 Wood Flycatcher, 1 Wilson's W, 2 Pale-vented Robins

1 Robin supplementary Silver-throat
1 Robin intra-specific supplant (obvious, hostile)

The Robin is certainly a most aggressive species. Obviously a disruptive force in the mixed flocks. These particular robins seem to have a grudge against Silver-throats

The Slate-throated Redstarts do not seem to be nuclear in these flocks. They are perhaps more often associated with mixed flocks than not, but they don't react to the other species very conspicuously as do the others next to them in very conspicuous ways.

October 7, 1960
Cerro Punta

Working by great bend 6.15 a.m.

Group I (The same as group I, Oct 5) 6 Brown-caps, 2 Rufous fronted Foliage Gleaners, 2 Yellow-thighs, 1 Wilson's W, 2 Silver-throats

7 Foliage gleaners ——→ Brown caps
2 Brown Caps ——→ Wilson's W
3 Wilson's W ——→ Brown Caps
3 Yellow-thighs ——→
2 Yellow-thighs ——→ Brown-caps

The white under sides of the wings of the Brown-caps are very conspicuous in flight and during W F's. Typical flock pattern

1 Yellow-throat singing, Brown-caps
Also 1 ♂ Summer Tanager (full adult plumage) in flock, = 1
Pepper-shrike, 1 ♀ Red-headed Bunting

2 Yellow-throats ♂ ——→ Brown-caps
2 Foliage gleaners ♂ ——→
3 Foliage gleaners ♂ ——→ Brown-caps
1 Foliage gleaner ♂ ——→
1 Yellow-throat ♂ ——→ Foliage gleaner
1 Foliage gleaner ♂ ——→ Yellow-throat

This flock today seemed to essentially the same as the day before yesterday. A group of Brown-caps, "attended" by a pair of Yellow-throats and a pair of Foliage gleaners. First became active around 6:30 or 6:45, and died by 7:00.

I saw a little more of the formation of the flock this morning. When I first arrived, I saw only a little group of appx. 3 Brown-caps, feeding actively but quietly. The Yellow-throats were moving about some distance away from the Brown-caps. Apparently not part of the mixed flock yet, but heading irregularly in the general direction of the Brown-caps. Then, around 6:30-6:45 there was a sudden outburst of SR-ing among the Brown-caps. At this time, I noticed that there were at least 6 Brown-caps in the group. What I imagine happens is that the family parties of Brown-caps sleep separately, and only encounter one another some time after dawn. This particular flock seems to contain at least two family parties of Brown-caps. (I saw no signs of any birds "migrating" on territories here this morning.) At the same time that I heard the big burst of SR-ing among the Brown-caps, I saw that they had been joined by the Yellow-throats, the Foliage-gleaners, and the Wilson's Warbler. I imagine that the Yellow-throats and Foliage gleaners just start to feed at dawn, and then attach themselves to the Brown-caps whenever they happen to run into them. If they haven't run into the Brown-caps before the latter begin their frequent SR-ing, then they must certainly join the Brown-caps

as soon as the SR-vireo began.

The mixed flocks today kept within the same boundaries as the day before yesterday, but its movements within those boundaries seemed to be more regular today.

I know that there are Yellow-throats near the edge of the flock's range (if not actually inside the range). Why don't they join the flocks???

The conversation of the Yellow-throats with the flock this morning was very brief. When all the birds were feeding in the tree-tops. At other times, both the Yellow-throats and the Brown-caps were particularly noisy — these 2 species do seem to stimulate one another's vocal powers. Also very active. But I could n't really isolate any particular following or forming reactions. Although Yellow-throats do sometimes come very low, within 2 or 3 feet of the ground, they seem to be primarily birds of the high tree-tops. They occur in high tree-tops more often than do the Brown-caps.

I wonder if the Pepper-shrike is a regular member of these flocks? A very uncompromising species. But colored quite like the Brown-caps.

The Wilson's Warblers is literally peripheral. Almost always on the outskirts of the flock.

The Brown-caps certainly do not seem to have any special call which serves to bring the flock together or keep it together. (Vide Johnson's description of the mixed-species flocks on BCI.)

Working in a new place. On Lewis's property, just above great bend.

2:05 p.m.

Group II 1 Empidonax flycatcher, 1 Slate-throat, 1 ♂ Wilson's W

Group III 1 Slate-throat, 1 Black-cheek W, 1 ♂ Wilson's W, and 1 Wren

In relation to the loud CN's and CN Tsk's. I have heard (before the Black-cheek Warblers also utter them) Great CN's (single or in short, not very rapid series) Apparently when not disturbed by me. Quite like the ECN's of Alleghenies eff. Flowers?

Group IV 2 Yellow-throats, 1♀ Wilson's W

1 Yellow-throat nuptial-tuft Wilson's
1 Yellow-throat f ——→ Wilson's
1 Wilson's ♂ ——→ Yellow-throats
1 Wilson's f ——→ Yellow-throats

Group V 2 Brown-caps, 1 Yellow-throat, 1 Sum or ♀ Summer T, 2♂ Wilson's W., 1 Empidonax flycatcher

2 Wilson's W f ——→ Brown-caps

I wonder why the Wilson's Warblers are not followed or joined more? They are so noisy, active, and brightly coloured. Perhaps because they only utter single CN's, no CN Tsk's? Or because they are usually single?? (In this connection, it might be noted that the 2 Brown-caps in the group above were walking far apart, and they seemed to be much less attractive than any other Brown-caps I have seen.)

October 6, 1960
Cerro Punta

Working below canopy pasture 6:30 a.m.

Group I 2 Yellow-throats, 1♂ Wilson's W.

Mixed flocks

I have twice, now, seen conspicuous, entire and noisy Boat-tails (one a single bird, once a pair) flying about without attracting any obvious attention from any other species.

I have also seen conspicuous, noisy and entire Black-chested Warblers move around without being followed or joined.

There seems to be much less tendency to form mixed flocks here now than at lower altitudes. (Or is it just that the Brown-caps are much more attractive than anything here?)

Group II 1 Wilson's W., 1 Slate-throat

Group III 3 Yellow-throats, 2 Black cheeks, 1 ♂ Wilson's, 2 Collared R., 1 Pale-vented Robin, 2 Sooty caps, 2 Prong-billed Barbets

2 Black-cheeks ⟶ Yellow-throats
1 Yellow-throat ⟶ Sooty caps
2 Yellow-throats ⟶

The Sooty caps are remarkably silent at this time of year.

I think that the Sooty caps are maintaining territory, or at least defending home ranges, here now. So, apparently, are the Yellow-throats. I have yet to see intra-specific fights in either species; but pairs or family groups seem to be well-separated.

The Yellow-throats now seem to have segregated out of the rest of Group III. Feeding on ground by themselves.

It is obvious of course that the Yellow-throats down below were also maintaining territories or home ranges (unlike the Brown-caps). Never more than 1 family party per mixed group.

Many of the Yellow-throats both here and down are going about in family parties of 3 (never more), consisting of 2 adults and 1 young. So this is of

III ✻ inthly not the breeding season for them (See Terry's notes on Pajaro Pt.

Group III (still) 1 Yellow-thighed ——→ Collared R.
2 Wilson's ——→

A squirrel with three flocks again!
1 Prong-billed Barbet ——→ Yellow-thighs
1 Brown-capped Vireo also joins flock also brown-backs
2 Brown-cap Vireo ——→
1 Collared R ——→
1 Diglossa in flocks, and 1 Solitaire, and 1 Flame-throat W.
1 Diglossa ——→ Sooty-caps
2 Collared R ——→ Sooty caps
1 Sooty cap ——→ Yellow-thighs
1 Sooty cap ——→ Solitaire
1 Green Honeycreeper in flock now.

It seems obvious that there is no special relationship between the Yellow-thighs and Sooty caps here. The Yellow-thighs will follow Sooty caps, just as they will follow almost anything; but they do not seem to be "fixated" on Sooty caps in the way they are on Brown-caps.

I think that the "party-independent" warbler association includes only the Red-starts (and possibly the Flame-throat), with the inevitable attendant Wilson's Warblers. It does not seem to include the Black-cheeks, which are primarily birds of the interior of scrub.

October 9, 1960
Cerro Punta

Working below upper pasture 6:30 a.m.

Group I 5 Yellow-throats, 1 Wilson's W

Group II 2 Tooty caps, 2 Collared R, 1 Wilson, W., 1 Green Ho
ument, 1 Yellow-throat, 2 Peewees, 1 Brown-capped Vireo

2 Collared R ♂ ——→ Tooty caps
2 Yellow-throat ♂ ——→
1 Collared R ♂ ——→
1 Brown-capped Vireo ♂ ——→
5 Wilson's W ♂ ——→ Collared R.

Also 2 Flame-throated Warblers in flock
1 Flame-throat ♂ ——→ Tooty caps

Also at least 1 Tree-creeper in flock, + 2 Lawrence's Cacique!
and 2 Black-backed Warblers Also couple Red Pepeateters.

A squirrel with the flock again! Also 1 wren, = 1 Flame throated R

I am fairly certain that the woodcreeper with this flock is Lepid
ocolaptes affinis. It is staying with the flock nearly constantly for quite a
long time. (This may also be the species I saw with the flock just above
the Clamos a few days ago.)

1 Tooty cap ♂ ——→
2 Collared R ♂ ——→

I think that there is only one large flock in this whole area Quite
diffuse, splitting and re-joining in rather amoeboid fashion. Possibly a few very
small flocks (two more than 2 or 3 birds) are more or less separate most of the time

Yesterday morning this flock formed rather late (after 7:30) and
remained conspicuously active for quite a long time. This morning it formed ear
lier (very shortly after I arrived) and did not remain conspicuously active very

As far as I could tell, the formation of the large flocks was a very casual process, both today and yesterday. The birds just drifted together. The "cascade" calls I at even hints of Sr key foot caps.

There are quite a lot of ♀ and/or immature Blue-colored Tanagers here. They seem to keep themselves quite distinct from mixed flocks most of the time.

1 Yellow-thigh } ⟶
1 Yellow-thigh } ⟶ Footy caps
1 Collared R } ⟶ Footy caps

October 10, 1960
Cerro Punta

Same place 6.30 a.m.

Watching a pair of Black-cheek Warblers foraging by themselves for quite 10 minutes. Here is an area which is often visited by the large mixed flocks. And yet they were not followed or joined by anything! It certainly looks as if they are not mountable! They didn't try to join anything else either. So I think this species may be classified as "occasional pairs" or "occasional parties" or "occasional singles".

Group I 3 Yellow-thighs, 2 Black-cheeks, 1 Brown-cap Vireo, 2 Footy caps, 2 Wilson's W, 1 Slate-throat R, 2 Collared R
2 Black-cheeks } ⟶ Yellow-thighs
(These were not the Black-cheeks which were not followed or joined earlier.)

1 Yellow-thigh } ⟶
1 Intra-specific fight between Wilson's Warblers
1 Black-cheek } ⟶

3 Wilson's W f ——→

Two squirrels with the flock again

Watching the first pair of Black-chucks again still not being followed or joined (although there are Wilson's Warblers, Myiarchuses, and Yellow-throats, at least, in the neighborhood)

Here is a family of 3 Yellow-throats here which has been moving about by itself for quite a long time now. It was circumvented with the large flocks earlier this morning but the warblers (and the Yellow-throats) flew-off, and the Yellow-throats made no attempt to follow)

It is my impression that, here and now, with the breeding warblers and breeding-tanagers (i.e. the Black-chucks and the Yellow-throats) being so relatively un-attractive, the Yellow-throats tend to segregate out from the mixed flocks quite frequently — much more frequently than last March here (and much more frequently than the Yellow-throats [same-species] now, when the Brown-caps are active and noisy).

I think that the relative un-attractiveness of Black-chucks and especially Yellow-caps here now (compared with last March) must be due to the fact that they are less noisy now

This indicates that voice, not color or movements, is the principal constituent of a species attractiveness

1 Collared R j ——→ Plate-throat

1 Brown-capped Vireo j ——→ Plate-throat

1 Plate-throat f ——→

2 Wilson's W j ——→

2 Dendroicas (same species as yesterday) also in flocks

December 8th 1901
Rio Piedras

Beginning 7.00 a.m.

Group I 1 ♀ Yellow-Rump, 1 ♂ Yellow-Rump, 1 ♀ Tanager, 1 Palm Tanager

1 ♀ Tanager f ——→ ♀ Yellow Rump.
1 Palm j ——→

The Palm in this group was feeding very low, no more than 1 foot off the ground in very thick scrub

Group II 1 ♀ Vermilion, 3 ♀ Yellow-Rumps, 4 Palms.

1 ♀ Yellow Rump j ——→ Palm
1 ♂ Yellow Rump f ——→ Palm

Again, these Palms were very low

Group III 4 ♀ Yellow Rump, 1 ♂ Yellow Rump, 1 ♂ Tanager, 1 ♂ Blue Black Grosbeak. 3 Plain-colored Tanagers (!), 2 Golden Headed Tanagers, 1 Blue Tanager, 1 Panama Wren, 1 green-back 1 ♂ and 1 ♀ Pine Finch

1 case ♀ Yellow Rump deserted, not being followed
1 Blue j ——→ Plains
1 case ♂ Yellow Rump deserted, not being followed
1 Golden-back j ——→
1 ♀ Yellow Rump f ——→ Green-back

In this last flock, the Blue Golden-wing - Plain group were left the Rhamphocelus group. I & the association between the two groups was purely "casual"

The Blue, Golden-wings & Plains were, however, feeding quite the Cow-bird of the time; rather like the Palms I saw with Yellow Rumps earlier

I also saw a mixed flock of Blues and Golden-wings earlier this morning. They were feeding only moderately low, and kept quite apart from Rhamphocelus.

The Yellow-rumps certainly do not seem to be nuclear for any of the mixed blue and green species!

Also 1 Black capped Saltator in a group

Group IV 2 ♀ Variables, 1 ♀ Yellow-Rump

2 ♀ Yellow-Rump ♀ ⟶ Variables

Group I 1 ♂ Variable, 1 ♀ Yellow-Rump, 1 ♂ Yellow-Rump

1 case of ♂ Yellow-Rump defeated, not being followed

Group II 1 ♀ Yellow-Rump, 1 Palm, 1 ♂ Variable, 1 ♀ Variable

There are really quite a lot of Yellow-rumps here today. They are quieter, on the whole, than I expected. Quite silent, usually except when flying and/or disturbed by me.

They frequently occur in groups of 3 - 6, but apparently single

birds and pairs are not uncommon. They are put scattered all along the edge of the river. Not all divided into separate discrete flocks.

I have been impressed by how few of the birds follow Yellow-Rumps. Also by how frequently they follow other birds.

It is easy to imagine that the Yellow-Rumps could become a much easier species in other circumstances. Here they seem to be prevented from becoming numerous by 2 factors. 1. They cannot be common because the species below & next to them 2. They cannot be locally active nuclear because few or none of the other species in the region are as closely confined to river edges. (Yellow-rumps also tend to stay lower in the vegetation than most other warblers.)

I have seen very few Savannas here, too few to determine how they are relating to the Yellow Rumps. It may be significant, however, that the few Savannas I have seen have all been associated with Yellow Rumps

November 18, 1980
Rio Piedras

8:00 a.m.

Group I 4 ♀ Yellow-Rumps, 1 ♂ Yellow Rump, 1 Clay-colored Thrush, 1 ♀ Summer Tanager, 2 Green-backed Sparrows, 1 ♂ Barred Antshrike

3 cases ♀ Yellow Rump not being followed
1 case ♂ Yellow Rump not being followed

Group II 4 ♀ Yellow Rumps, 2 ♂ Yellow Rump, 1 ♀ Black-billed Cuckoo, 1 unid. ♂ Euphonia (Blue Bill), 1 Buff-throat Seltator

5 cases ♀ Yellow Rumps not being followed

1 ♀ Yellow-Rumps, 1 Pelew Dwarf, 1 Buff-throat Sultan

or

1 Buff-throat ♂ ⟶
1 ♀ Yellow-Rump ♀ ⟶ Buff-throat

Group IV 4 ♀ Yellow-Rumps, 2 ♂ Yellow-Rumps, 1 Golden-mantle Tanager, 1 ♂ Fulvous-vent Euplocomus, 1 ♀ Lawyer

1 ♀ Lawyer ♂ ⟶ Yellow-Rumps
1 Golden-mantle ♂ ⟶ Yellow-Rumps
1 ♂ Fulvous-vent ♂ ⟶ Yellow-Rumps

Lawyers impressed, today, by how remarkably infrequently the Yellow-Rumps are found and followed — especially in view of their extreme courtesies. At least 80% of all the Yellow-Rumps I saw today were not associated with mixed flocks in any way.

The four Lawyers I saw today were staying low in the shrubbery even more consistently than the Yellow-Rumps. (Yellow-Rumps do go quite high in trees with some appreciable frequency.)

MIXED FLOCKS — QUITO REGION

May 13, 1962,
Near Nono

This morning I saw a whole group of birds feeding and moving as a unit along the ravine. Including at least 4 Scaeri coribelli, 4 Forebellies (2 obviously forming a pair, the other 2 rather scattered), a pair of Thraupis olivi-cyanea, at least one of Diglossa glaucina, one bird that looked very much like a Buff-fronted Foliage-gleaner, various hummingbirds, and probably some other stuff.

For a while, it looked more as if the Forebellies were playing a passive nuclear role. They were repeatedly followed by the coribelli; and the 2 species, in turn, were followed by the olivi-cyanea's. But then the Forebellies moved further on, into some trees, and were not followed again. The whole group seemed to disperse in an unobtrusive way.

The Forebellies (being very conspicuous) may be as attractive as possible to birds of other species, without having developed any special mechanisms especially designed to attract birds of other species, and without being the object of any special inter-specific preferences.

I have yet to see any signs of an active nuclear species here

RE INTER-SPECIFIC REACTIONS — QUITO

May 23, 1962
Quito

Here is a specie of *Myiarchus* here ♂'s ♀'s apparently identical. Quite remarkably similar to *Attapetes rufinucha*, except for yellow eye-ring and white patches on tail.

Always in pairs (at least now)

Feed in eucalyptus trees, at same levels as Diglossopes. Looking for insects in the same way. Also feed in scrub, in same areas as Diglossopes, *D. atterima*, and (probably) *Conirostrum*. As far as I know, do not feed on flowers or nectar.

Must be an important competitor of Diglossopes (at least)

Does not fly catch like the Chiriquí redstarts (presumably there are no suitable flies here).

Utters lots of "Zrit" "CN"s. Sometimes accelerated like "Zrit"s of Diglossopes. Perhaps utters "Zuk"s as well

Long quite like that of *D. atterima*, but probably more "warbling", and usually or always ending with a distinct "Zazazaa".

Ignored and is ignored by Diglossopes — even when feeding within a few inches of the latter.

Intra-specific Digits Cerro Punta

Parula W. 1

Silver-throat II

Wilson's W II

Yellow-throats 1

Pale-bellied Thrush 1

Supplanting Cerro Punta

Kirkadee → Pale-bellied Thrush 1

Pale-bellied Thrush → Silver-throat III

Silver-throat → Brown-cap 1

Yellow-throat → Wilson's W. 1

Enemann, E (1957) "The birds of the province of Bocas del Toro, Panama" —
Condor 59, p 247-262

Sporophila torqueola and S. aurita commonly associating together. Also Volatinia.

Griscom, L. (1932) "The distribution of bird life in Guatemala" — Bull. Amer. Mus. Nat. Hist. 64

Volatinia nearly always in company with Sporophila

Peterson, A. (1943) "The birds of southern Veracruz, Mexico" — Proc. U.S. Nat. Mus. 3164, vol. 93, p. 215-340

Sporophila torqueola and Volatinia in association

Catamenia auales
Catamenia viennata
Catamenia Rosenbergi ♂ Plate Yellow bill Rufous
under tail-coverts Much lighter
than plebeyus

David's Notes

Jamming

1 Browncap → Yellow-thigh

2 Sootycap → Yellow-thighs

1 Yellow thigh → Slate throat

1 Yellow thigh → Browncap

1 Yellow thigh → Sootycap

1 Yellow throat → Yellow thigh

2 Silver-throat → Browncap

1 Speckled → Silver-throat

1 Flame throat → Silver-throat

Following

3 Yellow-thigh → Sooty cap

1 Yellow-throat → Flame throat

Supplanting

1 Red headed Bunlet → Bayou T.

Intra specific Inglis

Brown-cap	3
Foot cap	1
Yellow-thigh	2

March 8, 1959. Cerro Punta.

GENERAL COMMENT ON THE MIXED SPECIES FLOCKS I HAVE SEEN NEAR HERE ON THIS TRIP.

Frequent, mixed-species flocks are conspicuous for their absence here now. The only common mixed flocks we have seen are based upon the two redstarts, especially the Slate-throated Red-start. And tanagers are seldom or never associated with such flocks now.

The nearest thing we have seen to a mixed flock including tanagers or finches are a few associations of several species feeding in the same trees or bushes for more or less brief periods. Such associations are probably purely "casual".

Yellow-thighed Finches and Yellow-throated Vireos are often feeding near together in the same hedges in the whole area from appx. 5000 ft to appx. 7000 ft.

We once saw Yellow-thighed Finches associated with a flock based upon Black-cheeked Warblers in forest above 7000 ft.

Down in the sub-tropical forest, between 4000 and 5000 ft, we once saw a few Brown-capped Bush-tanagers, Silver-throated Tanagers, Wilson's Warblers, and Tennessee Warblers, feeding in the same trees and moving about more or less together for a short time.

March 10, 1959
Cerro Punta

ADDITIONS

Since writing the above a couple of days ago, I have been watching one or more mixed flocks in second-growth scrub & forest at the 7000 (appx.) ft. level. Based on Collared Redstarts always including 1 or 2 or more Wilson's Warblers and at least 1 pair of Yellow-throated Vireos Sometimes including Yellow-throated Chlorospingus, Sooty-capped Bush-tanagers, Slate-throated Redstarts, Flame-throated Warblers (Vermivora gutturalis), Black-cheeked Warblers (Basileuterus melanogenys), and a Paisley Tree-runner the Collared Redstarts obviously controlling the direction of the movements of the flock

July 11, 1959 Cerro Campana

MIXED "FEEDING-ASSOCIATIONS" HERE.

On this trip here, I was surprised to find large groups of several species of tanagers here. All more or less feeding together in the same trees; and occasionally (at least) most of the birds moving in the same direction, eventually; but this sort of association seems to be much looser than the Plain Tanagers feeding on Barro Colorado, or the Brown-capped Bush Tanagers and Collared Redstart flocks at Cerro Punta.

There do not seem to be any really "nuclear" species in the "feeding associations" ("FA"s) here now, although all the groups I have seen so far have included at least Silver-throated & Bay-headed Tanagers and Tawny-capped Euphonias. But the birds in these FA's seldom or never flew off together, one right after the other, as the Plain-Blues - Palms may do on BCI.

It may be significant, in this connection, that although many of these species are quite noisy, giving a lot of CN's, they none of them utter as many CN's as the non-nuclear species of other flocks I have watched.

I have also seen quite a number of other species associated with the FA's but from time to time today. Among these were Black and Yellow Tanagers (1 pair, for quite some time), Blue Tanagers (1 pair, for a short time), a single Green Honeycreeper (for a short time) and a single or a pair of Hepatic Tanagers (for a short time).

March 20, 1960 Cerro Punta.

MIXED FLOCKS, 7000 ft AND ABOVE

We have only been watching flocks fairly high up the mountain all three altitudes mixed flocks are still common, apparently not disturbed by the approach of the breeding season

Almost every flock we have seen here, at these high altitudes has included several Collared Redstarts, one pair of Yellow-thighed Finches, one or more Wilson's Warblers, and a single bird or a pair of Sooty Capped Bush-tanagers. Probably also a pair of Yellow-throated Vireos in almost ever flocks, and one or more birds of one or more species of Dendrocolaptids. At the highest levels, one or more Black-cheeked Warblers are also closely associated with almost all flocks. Slate-throated Redstarts, Flame-throated Warblers, and even Bufflens, are sometimes associated with the flocks, but they seem to be less common and/or more independent at all three relatively high altitudes

(Note: Collared Redstarts are not common now at relatively low altitudes where they were common during March of last year; and I have yet to see Flame-throated Warblers quite as low as I did last year.)

March 21, 1960 Cerro Punta,

MIXED FLOCKS, 7000 ft AND ABOVE.

I don't think my comments yesterday were very penetrating

We have actually been observing 2 kinds of flocks.
Below the pasture, the flocks are encountered composed of Yellow-thighed Finches, Yellow-throated Vireos, Sooty-Capped Bush-tanagers, and Wilson's Warblers. Plus miscellaneous other stragglers from time to time, of course. (Today we even saw a Peppereater more or less associated with a flock below the pasture)

Above the pasture, Collared Redstarts & Black-chested Warblers become "regular" members of the flocks (along with other things as usual).

Among the definite positive social reactions we have seen in these flocks were the following: 1 case of a Sooty Capped Bush Tanager following a pair of Yellow-thighed Bush Finches. 1 case of a Wilson's Warbler following a pair of Sooty Capped Bush Tanagers.

MIXED FLOCKS, 6000 ft OR LOWER

Today we saw a pair of Silver-throated Tanagers join, and twice follow, a flock of 4 or more Brown-capped Bush-tanagers.

March 22, 1960. Cerro Punta

MIXED FLOCKS, 6000 ft OR LOWER

Today we saw a most interesting flock, quite low, almost at the upper edge of the "llanos".
It was composed of the following birds: at least 3 Brown-

Capped Buch-tanagers, 1 pair of Spotted Tanagers, 1 ♂ Scarlet thighed Dacnis, 1 ♂ Wilson's Warbler, 2 Blue Tanagers D-finite & moving about together. We only special social mention we noted was one instance of a Spotted Tanager chasing away the Dacnis when the latter got too near.

In the same area, at approximately the same time, were at least 2 (and probably more) Silver-throated Tanagers, and 1 Slate-throated Redstart.

This group would appear to have been a mixture of a Highland mixed flock and a Lowland mixed flock. (It may be significant, in this connection, that it has been raining hard all along the upper part of Cerro Punta and the volcano almost steadily since yesterday afternoon. The rain has been much less lower down, near the Chorro. So perhaps the Highland flocks have been moved downward.)

March 29, 1960. Cerro Punta.

ALL MIXED FLOCKS HERE

Although we haven't been able to see much in the way of mixed flocks here the last days, a few things seem to be clear.

The principal constituent of the flocks is the Brown-Cap — Yellow-thigh relationships or the Footy Cap — Yellow-thigh relationships. This seems to form the nucleus of all the really large and conspicuous flocks.

One or two Wilson's Warblers usually follow each flock. They might be considered "parasites", except for the fact that their loud CN's may increase the attractiveness and cohesion of the flock as

a whole

We have seen few or no obvious cases of Wilson's Warblers following or joining other individual birds in mixed flocks. All or most Wilson's Warblers just seem to drift along in more or less the same general direction, at approximately the same speed, as any particular flock they happen to be associating with at the time.

The Yellow-throated Vireos are even more "parasitic" than Wilson's Warblers, as they contribute much less to the general movements of a mixed flock. At this season, at least, the Yellow-throats are always in pairs, and there is never more than one pair per flock. It is also barely possible that the Yellow-throats perform more "special" following reactions than the Wilson's Warblers.

(The roles of the tree-creepers associated with mixed flocks may not be very different from that of Wilson's Warbler and/or that of the Yellow-throats. The Orange-bellied Flowerpeckers also behave in a somewhat similar way.)

(The behavior of Black-cheeked Warblers in relation to mixed flocks is discussed in today's notes on Basileuterus.)

We have not seen enough Redstarts associated with flocks here this trip to be able to add anything to my previous notes.

May 25, 1961 Cerro Pedregosa, near Horo

On previous years, I got the impression that mixed flocks of 9-primaried songbirds did not occur here.

During my observations this year, however, I have seen a few mixed flocks. Including almost anything: Atlapetes rufinucha, Diglossa atrocyanea, the local "Hemispingus", Myiothlypis luteoviridis, the Black-eared Warbler (Basileuterus nigrocristatus), and a local species of Furnariid (rather Hyloctistes-like in shape — essentially rufous all over, lighter below, probably with a dark streak through the eye). But I still think that such flocks are usually purely casual aggregations (see below for the one conspicuous exception).

It may be significant that none of the species listed above show much intra-specific gregariousness.

It may also be significant that mixed flocks were much more conspicuous this evening than at any other time I have met such birds here. It was very foggy this evening, with nearly zero visibility.

The local redstart (Myioborus melanocephalus ruficoronatus) is definitely not part of the mixed flocks here. It stays up in the trees most of the time, while the mixed flocks are usually in moderately low shrubbery and hedges.

The only very distinct inter-specific relationship I have noted was between Atlapetes rufinucha and the local furnariid described above. This evening, a pair of the furnariids seemed to be following a pair of the finches, quite steadily. (When the birds were encountered).

	No. Buds	No. Flowers	Following	Joining	Being Followed	Being Joined	
Black-cheeks W	𝍸 𝍸 I	𝍸 III	𝍸	II	𝍸 I		12
				6		6	
Golden-crown W	𝍸 I	I		I	I	I	2
				0		2	
Scarlet-throat R	𝍸 𝍸 𝍸 𝍸	𝍸 𝍸 𝍸 I	II	I	II	III	8
				3		5	
Collared R	𝍸 𝍸 𝍸 I	𝍸 𝍸	III	𝍸 IIII	𝍸 I		✓18
				12		6	
Buff-frontal Foliage-gleaner	IIII	II	𝍸 𝍸	𝍸 𝍸 II	I		✓23
				22		1	

	No. Buds	No. Flowers	Following	Fruiting	Buds Followed	Buds Joined
Brown Caps	𝍸 𝍸 𝍸

POSSIBLE CASES SOCIAL MIMICRY

I Large conspicuous tyrant flycatchers of Central American region. Bright yellow breasts, striking black and white stripe pattern on breast. Species of the genera Megarhynchus, Pitangus, Myiozetetes. References: SUTTON, G. M., (1951), "Mexican Birds", Univ. Okla. Press, Norman, Okla. STURGIS, B. B. (1928) "Field Book of Birds of the Panama Canal Zone", G. P. Putnam's Sons, N.Y. - London

PARTLY SOCIAL MIMICRY?

I Supposed examples of Mullerian or, more probably, Batesian Mimicry. The Black Drongo, Dicrurus adsimilis, and a black flycatcher, Melaenornus pammelaena. Friar-birds and orioles Reference: SHEPPARD, P.M., (1958), "Natural Selection and Heredity", Hutchinson & Co., London

HUXLEY, J.S (1938) "Threat warning coloration in birds, with a general discussion of the biological functions of color." — Proc. 8th Int. Orn. Congr., Oxford, p 430-455

Use of word "episematic"
Also states the fact that the same color pattern may subserve several different functions.

FRIEDMANN, H. (1935) "Bird societies" — from "A Handbook of Social Psychology", Clark Univ. Press, Worcester, Mass., U.S.A., pp 142-184

General survey of sociability in different groups

———— (1950) "The breeding habits of the Weaver birds. A study in the biology of behavior patterns." — from the Smithsonian Report for 1949, Smithsn. Inst., Washington, pp. 293-316

General survey. Philetairus particularly useful example

WING, L. (1946) "Species association in winter groups" — Auk 63, p. 507-510

GENERAL REFERENCES

COTT, H.B (1940) "The celebility of birds: illustrated by five years' experiments and observations (1941-46) on the food preferences of the hornet, cat and man; and considered with special reference to the theories of adaptive coloration." — Proc. Zool. Soc. London 116, pts 3 and 4, pp. 371-524.

Stresses that "rarability" is a factor reducing vulnerability. (see also Mottram

Also mentions that black & white are the most conspicuous of all colors

MOTTRAM, J.C (1915) "The distribution of secondary sexual characters amongst birds, with relation to their liability to the attack of enemies." — Proc Zool. Soc. London 1915, p. 663-678.

More Notes from Cott.

"flash colors" are "procpisematic" according to Huxley, 1934 and 1938.

White color of sea-birds. Called "synepisematic" by ~~Armstrong~~ Cott

ARMSTRONG, E.A. (1946) "The coloration of sea-birds" — Birds of Britain, 2, p 15-19.

DARLING, FF (1952) "Social Behaviour and Survival" — Auk 69, p 183-171.

Lists some advantages of gregarious feeding and communal defence against predators

CONDER,

U

SOME ADAPTATIONS INVOLVED IN THE DEVELOPMENT OF GREGARIOUS HABITS

A bird usually reacts to the presence of other birds by showing several contradictory and more or less "incompatible" tendencies. It is often partly hostile and partly "friendly", apparently wanting to join the other birds, and also attack them and/or escape from them at the same time. The resolution of such conflicting reactions is a particularly difficult problem in highly gregarious species, which have had to devise methods of both increasing the general social or flocking tendencies and controlling the hostile responses which are provoked by any close association of different individuals, (it seems to be very difficult, i.e. very disadvantageous, to dispense with hostility altogether). Most gregarious species have evolved specialized adaptive behavior patterns in order to attain both objectives.

The patterns which help to promote flocking are usually obvious and relatively simple. Almost all the highly gregarious species have developed special social calls, conspicuous wing and/or tail movements, and (very frequently) increased general mobility or "restlessness", all of which seem to be designed to increase the attractiveness of a social group and maintain cohesion within it. Some gregarious species have developed such characters without greatly altering the "hierarchy of instincts"; but others have also evolved a special, and more or less independent, "general social" drive or instinct which is not found in more solitary species.

The control of hostile responses would seem to be a more complicated matter in some respects, and has been achieved by a greater variety of methods. Some species have evolved special displays (ritualized social signals) which may be used by one bird of a group to reduce the strength of the internal attack and/or escape drives of other members of the group, while other species have developed displays which help to divert the overt expression of hostility within the group into relatively harmless channels. The overt expression of hostility may even be reduced without the intervention of special displays, by directly reducing the response to certain particular types of hostile stimuli (without weakening the internal hostile drives in general). Some species may use different methods in different circumstances; and these variations would also seem to be adaptive, in some cases at least, as they can be correlated with particular factors of the external environment.

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CLASSIFICATION

As there seems to be some evidence that Diglossa may be related to Conirostrum, I have looked at several species of Conebills in the USNM. The plumage of the ♂'s of some Conebills is surprisingly bright, with considerable black and/or iridescent blue, although the actual patterns are not particularly reminiscent of any Flower-piercers I know. (There seems to be considerable sexual dimorphism in all or most of the species of Conebills in which the ♂'s are brightly colored. The ♀'s tend to be much duller.)

Below are descriptions of the brightly colored ♂'s of 3 species of Conebills:

1. sitticolor Black head & throat, blue back, rufous breast and belly.

2. albifrons Generally black, with a white forehead, and blue on the back and upper wing-coverts.

3. atroyanaeum. Generally black, with blue on crown, back, scapulars, and upper wing-coverts

Gregarious

Relatively little aggressive
Hostility actually reduced
A relatively large proportion of hostility expressed by
display
Relatively few distinct types of display
Some special types of displays (i.e. numeric)

Non-gregarious

Relatively aggressive
Hostility not reduced
A relatively smaller amount of hostility expressed by
display
A relatively large number of distinct types of display.
Few or no special types of display

CLASSIFICATION

The Tanagers, as a whole, would seem to fall into the following major groups:

I Euphonias Quite distinct

II Blue and Green Tanagers. Usually, but not always, with some bright (frequently iridescent) blue or green in plumage. Also frequently black. Sometimes bright red or yellow. Very few species with dull plumage. Sexes apparently always essentially identical

Tanagella
Chlorochrysa
Pirrhidea
* Tangara
Iridosornis
Delothraupis
Stephanophorus
* Poecilothraupis
Baugeia
Buthraupis
* Dubusia
Compsocoma
* Hemispingus
Chlorornis ?

III Red and Yellow and Black Tanagers. Much more varied, although less successful, than the Blue & Green Tanagers.

The typical members of this group are brightly colored, with large areas of red, orange, yellow (and, less frequently, white), usually contrasted with black. In almost all these species, there is strong sexual dimorphism, the ♀'s being noticably duller than the ♂'s.

There are also a few members of this group in which both sexes are dull, usually grayish or olive, and identical with one another. They must not be considered "hen-feathered" species

None of the species in this group has bright blue or green in the plumage.

In addition to the more or less typical members of the group, there are a number of other, more or less aberrant, species which may be attached to it

A. Typical Members of the Group.

Spindalis

* Rhamphocelus

* Piranga

Phlogothraupis

Calochaetes

Chlorothraupis

* Habia.

B. Almost Certainly Members of the Group

Lanio

* Tachyphonus

Heterospingus

Euneornis

* Rhadinocichla
* Metrospingus
Calyptophilus
Chaunicoplilus
Hemispingus
Compsothraupis ?
Sericossypha

IV Howeycreepers Quite another problem !

V Warblers & Finch-like Tanagers. Probably extremely miscellaneous

* Chlorospingus
Cremnoscopus
Hemispingus
Neothraupis
Hemithraupis
Chrysothlypis
Erythrothlypis
Thlypopsis
Pseudospingus
Microspingus

VI Very problematical genera. Also obviously miscellaneous

Cyanicterus
Orthogonys
Heurgops

Malacotaraupes
Sciobothraupes
Cyphonaga
Pyrhocoma
Hemispiza
Arotaraupes
Conothraupes
Saltipospiza
Orchesticus
Oreothraupes
Schistochlamys

* Cissopis

Regular Passive Nuclear Species

Plain-colored Damage

Regular Active Nuclear Species

Calm Damage

Blue Damage

Green Housegrapes

Regular Anomalies

Blue Beans

Summer Damage

Occasional Passive Nuclear Species

Red-Capped Blue Housegrapes

Banana quit ?

Occasional Anomalies

Cannon Caused Damage ?

White Caused Damage ?

Explosions.

Agitators.

Regular Pan-mic Nuclear Species

Brown-capped Buch-tanager

← ? Footy cap.
Black-cheek W.
Golden-crown W.

Regular Austral Nuclear Species

Yellow-throated Finch
Wilson's Warbler
Collared Redstart ?

Regular Associates

Rufous-fronted Foliage-gleaner
Other Furnariids ? Dowcet ?
Yellow-throated Bush-finch
Slate-throated Redstart
Summer Tanager ? Robin ?

Occasional Associates

?
Velvet-throat
Spectacled Tanager ?
Flame-throated Warbler ?
Pepper-shrike
Brown-capped Vireo
Green Toucanet
Prong-billed Barbet ?
Flame-colored Tanager ?

Description of supposed Rufous-Sconted Foliage gleaner

Forehead rufous
Back of neck (= crown?) grayish
Light streak behind eye
Generally buffy underneath
Tail and wings (not rump) bright rufous

Mixed Flocks

Isla del Rey
June 7, 1907

Arrive at 7:30 a.m.

Lots of BB grassquits, several streaked saltators, one juv. or ♀ Sangre seen almost immediately

8:00 a.m. Lots more sanaples A large party of RLBH's (at least 30 ♂'s and 30 ♀'s) And more streakeds. Not really moving with one another, although all in same area.

8:05. First BT seen. Alone but in same area.

Some BG's around

1:00 p.m. I have still to see any PT's or RCT's around. The absence of PT's is particularly surprising, as there are lots of coco and other palms around

As a result of the absence of these 2 nuclear species, there are no "real" mixed flocks around. Lots of associations between different species, but all seem to be purely "casual"

MIXED SQUIRREL-BIRD FLOCKS

Mountains above El Valle — Sept 8, 1962. A large mixed flock of birds, including ant-birds and at least one tree-creeper. With a redchin squirrel (perhaps the usual Low-land Red-tail) near the center. Birds obviously not mobbing the squirrel.